

DETAILED ACTION

Response to Amendment

1. The amendment filed 13 July 2011 has been entered. Claims 1 and 6-10 are currently pending in the application. The rejections of record from the office action dated 22 April 2011 not repeated herein have been withdrawn.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of

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the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 1 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Nanavati (WO 01/66655) in view of Wyman (US 5,077,135).

Regarding claims 1 and 8-10, Nanavati discloses a coating composition having barrier properties (i.e. barrier layer) (P1/L5-10), comprising N-(2-aminoethyl)-3-aminopropyltrimethoxy silane (i.e. (ii) at least one aminoalkylalkoxysilane; N-(2-aminoethyl)-3-aminopropyltrimeth-oxysilane) (P4/L7-10), pyrogallol (i.e. (iii) at least one polyol; aromatic polyol; pyrogallol) (P6/L6-10), reacted in a solvent such as methanol in an amount of 1% to about 99% of the composition (i.e. reaction products produced under hydrolysis conditions (vi) organic solvent; aliphatic alcohol) (P6/L10-20), further comprising a photoinitiator (i.e. which comprises photoinitiator) (P8/L25-30).

Nanavati does not disclose (i) at least one organoalkoxysilane having organofunctionality having at least one unsaturated hydrocarbon group; or that the molar ratio of (i) : (ii) : (iii) is (i) = 1 and (ii) = from 0.5 to 1.5, and (iii) = from 0.3 to 1.1.

Wyman discloses a coating for improving gas impermeability (i.e. a barrier layer) (C2/L1-5), comprising vinyl triethoxy silane (i.e. (i) at least one organoalkoxysilane having organofunctionality having at least one unsaturated hydrocarbon group;

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vinyltriethoxysilane) (C6/L60-65). Wyman discloses that the siloxane polymers and copolymers provide a coating that is smooth and uniform (C6/L65-68), therefore having improved barrier properties (C3/L42-50).

Nanavati and Wyman are analogous art because they both teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vinyl triethoxy silane of Wyman in the coating composition of Nanavati to provide a coating composition wherein the coating is smooth and uniform, therefore having improved barrier properties.

Given that the solvent is present in an amount of 1% to 99%, it is the examiner's position that the solids content of the composition would be from 1% to 99% which clearly overlaps the instantly claimed range of 10 to 60% by weight solids.

Neither Nanavati nor Wyman disclose that the molar ratio of (i) : (ii) : (iii) is (i) = 1 and (ii) = from 0.5 to 1.5, and (iii) = from 0.3 to 1.1. However, when faced with a mixture, one of ordinary skill in the art would be motivated by common sense to select a 1:1 ratio, a ratio that falls within the presently claimed amount, absent evidence of unexpected or surprising results. Case law holds that "[h]aving established that this knowledge was in the art, the examiner could then properly rely... on a conclusion of obviousness, 'from common knowledge and common sense of the person of ordinary skill in the art within any specific hint or suggestion in a particular reference.'" *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Alternatively, it is noted that that Nanavati discloses that the pyrogallol reacts with the aminofunctional silane forming a complex which provides unique physical

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properties which are good for barrier coatings (P5/L25-30) and that Wyman discloses that the siloxane polymers and copolymers provide a coating that is smooth and uniform (C6/L65-68), therefore having improved barrier properties (C3/L42-50). Since the instant specification is silent to unexpected results, the specific molar ratio of the organoalkoxysilane the aminoalkylalkoxysilane and the polyol is not considered to confer patentability to the claims. As the smoothness/uniformity (i.e. physical properties) of the composition and the barrier properties of the composition are variable(s) that can be modified, among others, by adjusting said molar ratio, the precise molar ratio of these components would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed molar ratio cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, molar ratio of the organoalkoxysilane the aminoalkylalkoxysilane and the polyol to obtain the desired balance between the physical properties and the barrier properties (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (In re Aller, 105 USPQ 223).

6. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanavati (WO 01/66655) in view of Wyman (US 5,077,135), as applied to claim 1 above, in further view of Ichikawa et al. (US 4,735,832) or Komada (US 2001/0038894).

Regarding claim 6, modified Nanavati discloses all of the claim limitations as set forth above. Modified Nanavati does not disclose that the composition employs a component (iv) comprising at least one member selected from the group consisting of tetraethoxysilane, oligomeric tetraalkoxysilane, propyltrimethoxysilane, propyltriethoxysilane, octyltrimethoxysilane, octyltriethoxysilane, alcoholic and or aqueous compositions of oligomeric cocondensates composed of aminoalkylalkoxysilanes and of fluoroalkylalkoxysilanes and also oligomeric condensates or cocondensates composed of alkylalkoxysilanes, and also oligomeric condensates or cocondensates composed of alkylalkoxysilanes and/or or vinylalkoxysilanes.

Ichikawa discloses a coating having a gas barrier characteristic comprising low permeability to oxygen and carbon dioxide (i.e. barrier layer) (C3/L55-60), comprising a composition comprising organoalkoxy silanes such as tetraethoxy silane (i.e. (iv) at least one member selected from the group consisting of tetraethoxysilane) (C9/L10-20).

Nanavati, Wyman and Ichikawa are analogous art because they both teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the composition comprising tetraethoxy silane of Ichikawa into the composition of modified Nanavati to provide a coating with further improved gas barrier characteristics such as low permeability to oxygen and carbon dioxide.

Komada discloses a gas barrier film (i.e. a barrier layer) ([0001]), comprising tetraethoxysilane ([0140]-[0143]). Komada discloses that the film has improved barrier properties ([0143]).

Nanavati, Wyman and Komada are analogous art because they both teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the tetraethoxysilane of Komada into the composition of modified Nanavati to provide a coating with further improved gas barrier characteristics.

Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Nanavati (WO 01/66655) in view of Wyman (US 5,077,135), as applied to claim 1 above, in further view of Huffer et al. (US 2002/0146525).

Regarding claim 7, modified Nanavati discloses all of the claim limitations as set forth above. Modified Nanavati does not disclose that the component (v) is employed and component (v) comprises at least one member selected from the group consisting of precipitated or fumed silica, silicates, aluminum oxides, aluminum oxide hydroxides and aluminum hydroxide.

Huffer discloses a coating as a barrier to oxygen and moisture (i.e. a barrier layer), comprising aluminum oxide ([0034]).

Nanavati, Wyman and Huffer are analogous art because they all teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the aluminum oxide of Huffer into the

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composition of modified Nanavati to provide a composition with enhanced barrier properties to oxygen and moisture.

7. Claims 1 and 8-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Wyman (US 5,077,135) in view of Nanavati (WO 01/66655).

Regarding claims 1 and 8-9, Wyman discloses a coating for improving gas impermeability (i.e. a barrier layer) (C2/L1-5), comprising vinyl triethoxy silane (i.e. (i) at least one organoalkoxysilane having organofunctionality having at least one unsaturated hydrocarbon group; vinyltriethoxysilane), gamma-aminopropyl tri-ethoxy silane (i.e. (ii) at least one aminoalkylalkoxysilane; 3-aminopropyltrieth-oxysilane) and methanol, subjected to hydrolysis (i.e. reaction products produced under hydrolysis conditions (vi) an organic solvent; aliphatic alcohol) (C6/L58-65; C5/L5-12). Wyman does not disclose (iii) at least one polyol aromatic polyol; pyrogallol, nor a photoinitiator.

Nanavati discloses a coating composition having barrier properties (i.e. barrier layer) (P1/L5-10), comprising N-(2-aminoethyl)-3-aminopropyltrimethoxy silane (i.e. (ii) at least one aminoalkylalkoxysilane) (P4/L7-10), and pyrogallol (i.e. (iii) at least one polyol; aromatic polyol; pyrogallol) (P6/L6-10), further comprising a photoinitiator (i.e. further comprising photoinitiator) (P8/L25-30). Nanavati further discloses that the pyrogallol reacts with the aminofunctional silane forming a complex which provides unique physical properties which are good for barrier coatings (P5/L25-30).

Wyman and Nanavati are analogous art because they both teach about barrier coatings. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pyrogallol of Nanavati into the

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composition of Wyman to provide a composition having unique physical properties which are good for barrier coatings, and to incorporate the photoinitiator of Nanavati into the composition of Wyman to provide a composition that can be cured more rapidly.

Neither Wyman nor Nanavati disclose that the molar ratio of (i) : (ii) : (iii) is (i) = 1 and (ii) = from 0.5 to 1.5, and (iii) = from 0.3 to 1.1. However, when faced with a mixture, one of ordinary skill in the art would be motivated by common sense to select a 1:1 ratio, a ratio that falls within the presently claimed amount, absent evidence of unexpected or surprising results. Case law holds that "[h]aving established that this knowledge was in the art, the examiner could then properly rely... on a conclusion of obviousness, 'from common knowledge and common sense of the person of ordinary skill in the art within any specific hint or suggestion in a particular reference.'" *In re Bozek*, 416 F.2d 1385, 1390, 163 USPQ 545, 549 (CCPA 1969).

Alternatively, it is noted that that Nanavati discloses that the pyrogallol reacts with the aminofunctional silane forming a complex which provides unique physical properties which are good for barrier coatings (P5/L25-30) and that Wyman discloses that the siloxane polymers and copolymers provide a coating that is smooth and uniform (C6/L65-68), therefore having improved barrier properties (C3/L42-50). Since the instant specification is silent to unexpected results, the specific molar ratio of the organoalkoxysilane the aminoalkylalkoxysilane and the polyol is not considered to confer patentability to the claims. As the smoothness/uniformity (i.e. physical properties) of the composition and the barrier properties of the composition are variable(s) that can be modified, among others, by adjusting said molar ratio, the

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precise molar ratio of these components would have been considered a result effective variable by one having ordinary skill in the art at the time the invention was made. As such, without showing unexpected results, the claimed molar ratio cannot be considered critical. Accordingly, one of ordinary skill in the art at the time the invention was made would have optimized, by routine experimentation, molar ratio of the organoalkoxysilane the aminoalkylalkoxysilane and the polyol to obtain the desired balance between the physical properties and the barrier properties (In re Boesch, 617 F.2d. 272, 205 USPQ 215 (CCPA 1980)), since it has been held that where the general conditions of the claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. (In re Aller, 105 USPQ 223).

Regarding claim 10, Wyman discloses that the composition comprises 10ml of a mixture of silanes dissolved in 90 ml of methanol and 1ml of water . Therefore, the quantity of silanes (i.e. solids content) is calculated to be 9.9% (10ml silanes/101ml total). It is apparent, however, that the instantly claimed amount of silanes and that taught by modified Wyman are so close to each other that the fact pattern is similar to the one in In re Woodruff , 919 F.2d 1575, USPQ2d 1934 (Fed. Cir. 1990) or Titanium Metals Corp. of America v. Banner, 778 F.2d 775, 227 USPQ 773 (Fed.Cir. 1985) where despite a “slight” difference in the ranges the court held that such a difference did not “render the claims patentable” or, alternatively, that “a prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough so that one skilled in the art would have expected them to have the same properties”.

In light of the case law cited above and given that there is only a "slight" difference between the amount of silanes disclosed by modified Wyman and the amount disclosed in the present claims and further given the fact that no criticality is disclosed in the present invention with respect to the amount of silanes, it therefore would have been obvious to one of ordinary skill in the art that the amount of silanes disclosed in the present claims is but an obvious variant of the amounts disclosed in modified Wyman, and thereby one of ordinary skill in the art would have arrived at the claimed invention.

8. Claim 6 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wyman (US 5,077,135) in view of Nanavati (WO 01/66655), as applied to claim 1 above, in further view of Ichikawa et al. (US 4,735,832) or Komada (US 2001/0038894).

Regarding claim 6, modified Wyman discloses all of the claim limitations as set forth above. Modified Wyman does not disclose that the composition employs a component (iv) comprising at least one member selected from the group consisting of tetraethoxysilane, oligomeric tetraalkoxysilane, propyltrimethoxysilane, propyltriethoxysilane, octyltrimethoxysilane, octyltriethoxysilane, alcoholic and or aqueous compositions of oligomeric cocondensates composed of aminoalkylalkoxysilanes and of fluoroalkylalkoxysilanes and also oligomeric condensates or cocondensates composed of alkylalkoxysilanes, and also oligomeric condensates or cocondensates composed of alkylalkoxysilanes and/or or vinylalkoxysilanes.

Ichikawa discloses a coating having a gas barrier characteristic comprising low permeability to oxygen and carbon dioxide (i.e. barrier layer) (C3/L55-60), comprising a

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composition comprising organoalkoxy silanes such as tetraethoxy silane (i.e. (iv) at least one member selected from the group consisting of tetraethoxysilane) (C9/L10-20).

Wyman, Nanavati and Ichikawa are analogous art because they all teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the composition comprising tetraethoxy silane of Ichikawa into the composition of modified Wyman to provide a coating with further improved gas barrier characteristics such as low permeability to oxygen and carbon dioxide.

Komada discloses a gas barrier film (i.e. a barrier layer) ([0001]), comprising tetraethoxysilane ([0140]-[0143]). Komada discloses that the film has improved barrier properties ([0143]).

Wyman, Nanavati and Komada are analogous art because they both teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the tetraethoxysilane of Komada into the composition of modified Wyman to provide a coating with further improved gas barrier characteristics.

9. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Wyman (US 5,077,135) in view of Nanavati (WO 01/66655), As applied to claim 1 above, in further view of Huffer et al. (US 2002/0146525).

Regarding claim 7, modified Wyman discloses all of the claim limitations as set forth above. Modified Wyman does not disclose that the composition employs a component (v) comprising at least one member selected from the group consisting of

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precipitated or fumed silica, silicates, aluminum oxides, aluminum oxide hydroxides and aluminum hydroxide.

Huffer discloses a coating as a barrier to oxygen and moisture (i.e. a barrier layer), comprising aluminum oxide ([0034]).

Wyman, Nanavati and Huffer are analogous art because they all teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the aluminum oxide of Huffer into the composition of modified Wyman to provide a composition with enhanced barrier properties to oxygen and moisture.

Response to Arguments

10. Applicant's arguments filed 13 July 2011 have been fully considered but they are not persuasive.

Applicant argues that the Office Action fails to explain how the vinyl triethoxy silane contributes to the smoothness and uniformity of the coating of Wyman or why one of ordinary skill in the art would reasonably expect that such vinyl triethoxy silane could be successfully incorporated into the different combination of components in Nanavati.

Wyman discloses that the siloxane polymers and copolymers provide a coating that is smooth and uniform (C6/L65-68), therefore having improved barrier properties (C3/L42-50).

Applicant's argument is not persuasive because Applicant provides no evidence that one would not reasonably expect that such vinyl triethoxy silane could be successfully incorporated into the composition of Nanavati.

Applicant argues that examiner has not shown some apparent reason to combine the elements of Wyman and Nanavati.

As set forth above, Nanavati and Wyman are analogous art because they both teach about barrier layers. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use the vinyl triethoxy silane of Wyman in the coating composition of Nanavati to provide a coating composition wherein the coating is smooth and uniform, therefore having improved barrier properties.

As set forth above, Wyman and Nanavati are analogous art because they both teach about barrier coatings. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the pyrogallol of Nanavati into the composition of Wyman to provide a composition having unique physical properties which are good for barrier coatings, and to incorporate the photoinitiator of Nanavati into the composition of Wyman to provide a composition that can be cured more rapidly.

Applicant argues that the examiner fails to explain how the pyrogallol contributes to the unique physical characteristics of the coating or why there would be a reasonable expectation of success.

As set forth above, Nanavati discloses that the pyrogallol reacts with the aminofunctional silane forming a complex which provides unique physical properties which are good for barrier coatings (P5/L25-30).

Applicant's argument is not persuasive because Applicant provides no evidence that one would not reasonably expect that such pyrogallol could be successfully incorporated into the composition of Wyman.

Applicant argues that examiner provides no basis for the allegation that one of ordinary skill in the art would be motivated by common sense to select a 1:1 ratio.

Contrary to applicant's assertion and absent evidence to the contrary, it is clear that one of ordinary skill in the art at the time the invention was made would first choose equal parts of all components.

Applicant argues that the examples of the present invention demonstrate that compositions that do not include components (i), (ii) and (iii), or that do not include these components in the molar ratio required in claim 1 result in barrier layers with inferior oxygen permeation, therefore showing unexpected results.

First, the cited examples are not commensurate with the scope of the claims given that the examples only show specific components (i), (ii) and (iii) in specific ratios, not the broad components (i), (ii) and (iii) and broad molar ratios recited in the claims.

Second, the cited examples are not commensurate in scope with the closest prior art because none of the comparative examples teach N-(2-aminoethyl)-3-aminopropyltrimethoxy silane or gamma-aminopropyl tri-ethoxy silane.

Third, it is not persuasive because Wyman discloses vinyl triethoxy silane provides a coating having improved barrier properties (C3/L42-50). Therefore, it is not unexpected that the presence of vinyl triethoxy silane would improve the barrier properties.

Fourth, it is not persuasive because Nanavati discloses that the pyrogallol reacts with the aminofunctional silane forming a complex which provides unique physical properties which are good for barrier coatings (P5/L25-30). Therefore, it is not unexpected that the presence of pyrogallol would improve the barrier properties.

Conclusion

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

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the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to JAMES YAGER whose telephone number is (571)270-3880. The examiner can normally be reached on Mon - Fri, 7:30am-5pm, EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Rena Dye can be reached on 571-272-3186. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JY 9/7/11

/Rena L. Dye/
Supervisory Patent Examiner, Art Unit 1782